ANDRODIOECISM IN THE FLOWERS OF TROCHODENDRON ARALIOIDES

HSUAN KENG *

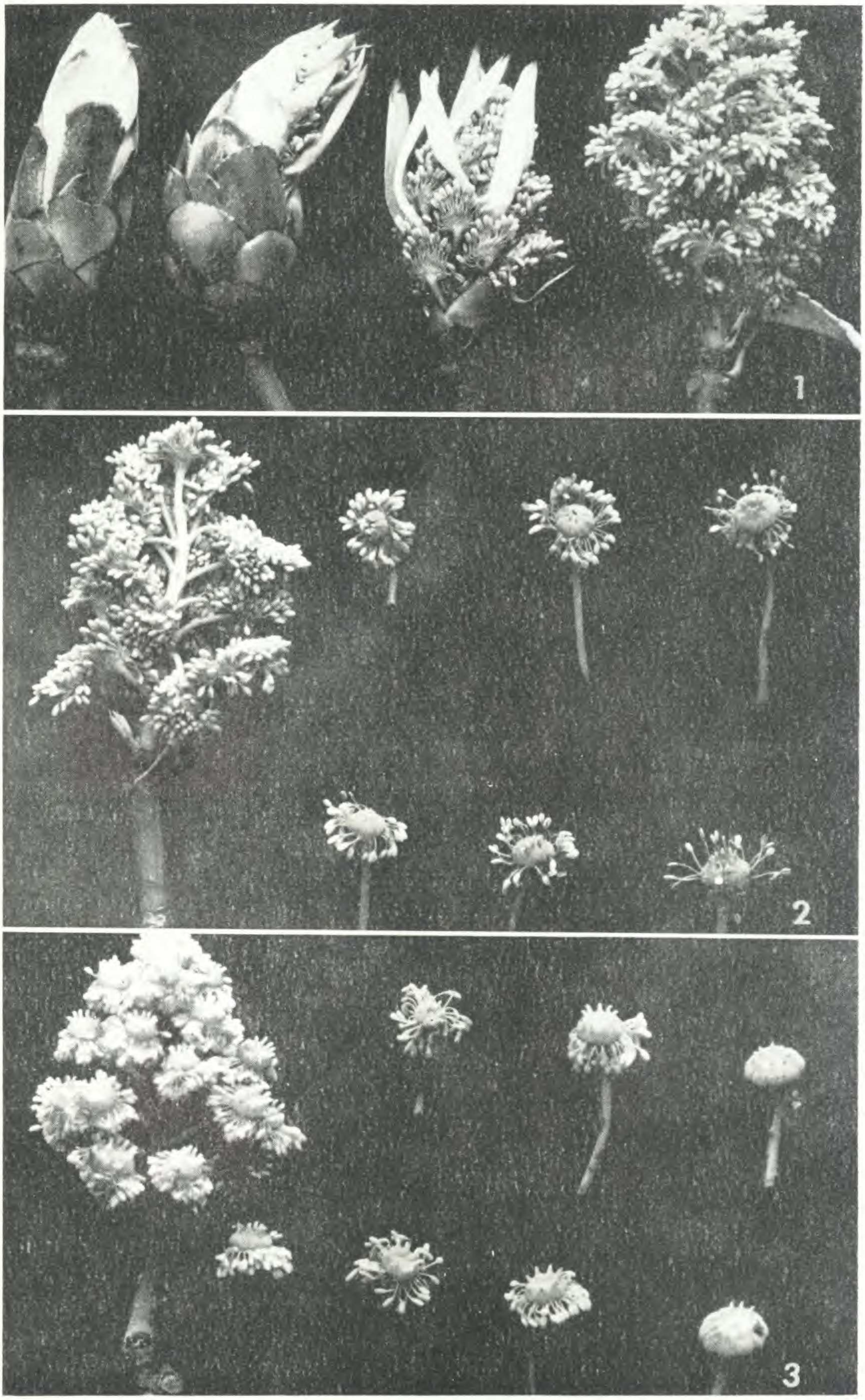
EXISTING DESCRIPTIONS of *Trochodendron aralioides* Sieb. et Zucc., the sole living representative of the vesselless angiospermous family Trochodendraceae (Smith 1945, Lawrence 1951), are based primarily on herbarium specimens. In all the botanical works consulted the flowers are described as hermaphrodite. The literature is reviewed in detail by Smith (1945).

In the spring of 1957, from January to June, the author visited Bamboo Lake, forty miles northwest of Taipeh, Formosa, every two weeks to collect flowering buds, flowers, and fruits of *Trochodendron*. A number of trees growing naturally in the valley and on the hill slopes were examined. About half of them were found to be protandrous: during the maturation of the stamens, the styles are clasped together (*Figs. 1, 2*). The other half were found to be protogynous, with the styles recurved distally, exposing the ventral stigmatic surfaces, at a time when the stamens had not yet dehisced (*Fig. 3*). All the flowers of any one tree without exception presented the same condition, *i.e.*, they were either all protandrous or all protogynous.

In mid-April the trees were in full bloom and were being frequented by honey bees (*Apis mellifica, A. indica*) and snake-eyed butterflies (*Ypthima motschulski*). The carpels and filaments of open flowers are pale yellowish green, while the anthers are bright yellow in color. A shining, viscid fluid coats the external surface of the gynoecia in a great majority of both protandrous and protogynous flowers, although no nectar has been found. The sweet, pleasant fragrance is detectable from some distance away, especially on a sunny morning. Occasionally a few flowers appear to lack a coating of viscid fluid and remain dry.

In protogynous flowers the stamens possess well developed anther-sacs which dehisce subsequently to release normal pollen. In addition, the gynoecia are also well developed. On the other hand, in protandrous flowers, with an equally normal androecium, the styles are at first tightly clasped, only opening slightly later. The trees which bear protogynous flowers produce normal follicles and fertile seeds. However, the author failed to find a single normal follicle on those trees which bore protandrous flowers. Thus, the species appears to be androdioecious, a condition which Darwin (1896, p. 13) pointed out as being exceedingly rare among flowering plants. It would be most interesting to have reports on the floral biology of *Trochodendron* from other parts of its range, particularly from the islands of Japan.

* The author wishes to express his thanks to Dr. Lincoln Constance and Dr. Herbert G. Baker for their helpful suggestions.



TROCHODENDRON ARALIOIDES Sieb. & Zucc.

LITERATURE CITED

DARWIN, C. The different forms of flowers on plants of the same species. Appleton, New York. 1896.

LAWRENCE, G. H. M. Taxonomy of vascular plants. Macmillan, New York. 1951.

SMITH, A. C. A taxonomic review of Trochodendron and Tetracentron. Jour. Arnold Arb. **26:** 123–142, 1945.

DEPARTMENT OF BOTANY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

EXPLANATION OF THE PLATE

FIG. 1. Stages in the unfolding of the inflorescence of *Trochodendron*. FIG. 2. Development of protandrous flowers. FIG. 3. Development of protogynous flowers. (All natural size.)